Physical Science Name _____

ACT Preparation- Pulling Forces

1. The first experiment compares _____ to _____.
2. Based on Figure 1, how much force is required to pull a 2.00 kg block?_____
3. What is the unit used for force?_____
4. For each 1 kg increase in mass of the block, what is the increase in force?_____
5. What force is required to pull 2.00 kg?_____
6. What mass is pulled by a force of 20 N?_____
7. The graph has 3 known data points graphed: a mass of 1.00 kg, 2.00kg, and 4.00 kg. But the graph can also be used to find the force on other masses. ***Interpolation*** is the process of reading a graph between two *known* data points. What is the pulling force required for a mass of 1.50 kg?_____ What is the pulling force required for a mass of 3.25 kg?_____
8. ***Extrapolation*** is the process of reading a graph *beyond* the known data. For instance, what would be the pulling force required for a mass of 4.50 kg?_____
9. Figure 1 shown different masses being pulled with different forces. But Figure 2 shows different masses being pulled with _____.
10. In figure 2, what force is used to pull the 2.50 kg block?
11. In figure 2, what is the speed of the 2.00 kg block after it has been pulled for 3.00 seconds?
12. In figure 2, what is the speed of the 3.00 kg block after it has been pulled for 1 second?
13. In figure 2, how long does it take each block to reach a speed of 20.00 m/s?
    a. The 2 kg block
    b. The 2.5 kg block
    c. The 3 kg block

14. Make a conjecture about the speed of a 3.00 kg block after it has been pulled for 4 seconds. Speed = _____ m/s

15. Make a conjecture about the speed of a 2.50 kg block after it has been pulled for 4 seconds. Speed = _____ m/s

16. In the previous 2 questions, what does the word "conjecture" mean?

17. In questions 14 & 15, did you need to interpolate *or* extrapolate?_____ Explain your answer.

18. For Figure 1, let ***m*** = block mass and let ***F*** = pulling force. Write an equation that shows the relationship between ***F*** and ***m***.

For Figure 2, each block shows a changing speed. The term for a change in speed is *acceleration*. The formula for acceleration is $acceleration = \frac{s_2 - s_1}{t_2 - t_1}$

19. For the 2.00 kg block: let t_1 = 1.00 sec, s_1 = _____; let t_2 = 2.00 sec, s_2 = _____.

20. Use the data in the previous question to calculate the acceleration of the 2.00 kg block. Use the formula for acceleration.

21. For the 2.50 kg block: let t_1 = 2.00 sec, s_1 = _____; let t_2 = 3.00 sec, s_2 = _____.

22. Use the data in the previous question to calculate the acceleration of the 2.50 kg block. Use the formula for acceleration.

23. Do the blocks of different mass appear to have the same acceleration?_____ Why do you think this is so?